UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,855	11/19/2003	Teruhiko Nawata	1217-032260	1711

28289 7590 10/11/2006

THE WEBB LAW FIRM, P.C.
700 KOPPERS BUILDING
436 SEVENTH AVENUE
PITTSBURGH, PA 15219

EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	**PAPER NUMBER**
1754	

DATE MAILED: 10/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/717,855	NAWATA ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-9* is/are pending in the application.

4a) Of the above claim(s) *8 and 9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Newly submitted claims 8-9 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the product as claimed can be produced by other process such as by Bridgman-Stockburger method followed by annealing.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 8-9 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garibin et al (6,673,150) in view of Kandler et al (6,740,159) and Yogo et al (2002/0166500).

Garibin '150 discloses a calcium fluoride monocrystal with diameter of 300 mm (= 30 cm), a thickness of 70 mm (= 7 cm), an optical uniformity of (1-3) x 10^{-6} and a birefringence of 1-3 nm/cm (note column 4, lines 20-22).

Garibin '150 does not disclose a thickness of greater than 70 mm.

Kandler '159 discloses that it is desired in the art to produce single crystal calcium fluoride with diameter of about 250 mm (= 25 cm) and a height (or thickness) of from 200 to 400 mm (= 20 to 40 cm) (note column 4, lines 4-6).

It would have been obvious to one of ordinary skill in the art to optimize the process conditions in Garibin '150 in order to produce calcium fluoride with thickness of 200 to 400 mm because such thickness is desired in the art as suggested by Kandler '159.

In the event that the product of Garibin '150 does not have the low birefringence as required in the instant claims, Yogo '500 can be applied to teach that calcium fluoride single crystal can be annealed to lower the birefringence (note paragraph [0099]).

The "as grown" limitation in the preamble is considered as a "product by process" limitation. However, when the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Claims 1-2, 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staeblein et al (2001/0025598).

Staeblein '598 discloses a method for making a uniform, large size single crystal of calcium fluoride (note claim 1). As disclosed in the Example, a single precursor crystal having a diameter of 300 mm and a thickness of 600 mm is used. After the process of Staeblein '598, the single crystal calcium fluoride formed would have the same dimension as the precursor.

Staeblein '598 teaches that mechanical stress, small angle grain boundaries and stress birefringence can be reduced or eliminated, when a finished single crystal is heated to a temperature over 1150°C in the presence of finely divided calcium fluoride powder (note paragraph [0018]).

Staeblein '598 does not specifically disclose the birefringence value for the product, however, since it is well known in the art that small birefringence value is desirable, it would have been obvious to one of ordinary skill in the art to optimize the process conditions of Staeblein '598 in order to obtain large single crystal of calcium fluoride with small birefringence value.

For the product-by-process limitation of "as grown", note the In re Fessmann, In re Brown as stated above.

Claims 1-2, 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ginoulakis '461 in view of Kandler '159.

Ginoulakis '461 discloses a method for crystal growth and annealing with minimized residual stress and suitable for production of calcium fluoride crystal (note column 1, lines 9-12). The calcium fluoride crystal is used for optical element (note

column 1, lines 22-30). This fairly teaches that the calcium fluoride crystal is a single crystal calcium fluoride.

The calcium fluoride crystal as a diameter of at least 6 inches (= 15.24 cm), such as 8 inches (= 20.32 cm) (as shown in Figure 6). The birefringence is substantially uniform and less than 1 nm/cm (note Figure 8).

For the "as grown" limitation, *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Gianoulaskis does not specifically disclose the thickness of the calcium fluoride crystal.

Kandler '159 is applied as stated above to teach the desire of calcium fluoride with a thickness of 200-400 mm.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the process condition in Gianoulaskis '461 in order to obtain a calcium fluoride crystal with a thickness of 200 to 400 mm, as suggested by Kandler '159 because such thickness is desirable when calcium fluoride crystal is used in optical application.

Applicant's arguments filed July 20, 2006 have been fully considered but they are not persuasive.

Applicants argue that the products as disclosed in the applied references are produced by Bridgman-Stockburger (BS) process, which have large internal strains and

when a large size crystal of more than 17 cm is grown, the crystal is partially poly-crystallized.

For the internal strains, the applied references teach that the birefringence can be reduced by annealing the calcium fluoride product. Applicants have not provided any evidence that the products as disclosed in the applied references are different in structure as compared to the claimed product.

Applicants argue that the drawbacks of the BS method are confirmed from the cited references.

Granted that the drawbacks of the BS method are recognized in the applied references, however, each of the references does disclose a method to overcome these drawbacks. For example, Gianoulakis '461 discloses an annealing process by maintaining a minimal temperature gradient in a calcium fluoride crystal while slowly reducing the bulk temperature of the crystal to lower the birefringence (note abstract and Figure. 8); Staeblein '598 discloses that the mechanical stress, small angle grain boundaries and stress birefringence can be reduced and/or eliminated, when a finished single crystal is heated to a temperature over 1150°C in the presence of a finely divided calcium fluoride powder (note paragraph [0018]).

The article by Sumiya et al is noted, however, the problems as stated in this article appear to be the same as those discussed in the applied references.

Applicants argue that none of the cited references could result in a non-annealed crystal having the claimed birefringence.

As stated in the above rejection, the "non-annealed" is considered as a "product-by-process" limitation. Applicants have not provided any evidence to show that one skilled in the art can tell the difference between a calcium fluoride product which was produced by the claimed invention from a calcium fluoride product which was produced by a BS method followed by an annealing step.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman can be reached on (571) 272-1358. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 or (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.

Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
October 2, 2006